ANTHRAX

Agent Information:

Aerobic, gram-positive, spore-forming bacteria. Can cause cutaneous, pulmonary or gastrointestinal infection, as well as meningitis or sepsis. Incubation is typically 1-7 days, but can be up to 2 months, for pulmonary anthrax and 1-12 days for cutaneous anthrax.

Signs and Symptoms:

Pulmonary anthrax begins as a severe influenza like illness (ILI) for 2-3 days with prominent symptoms of cough and chest pain to help distinguish from influenza. A brief period of improvement followed by rapid deterioration due to the production of toxin. Cutaneous anthrax begins as a papular lesion that progresses to a vesicular stage and then develops an eschar center.

Transmission:

No person-to-person transmission except rarely from skin lesions. Only those directly exposed to the bacterium are at risk of infection.

Decontamination:

Yes, if presentation from exposure is immediate.

Isolation:

None.

Protective Measures:

No equipment beyond Universal precautions or antibiotics is required for healthcare providers if presentation occurs days after exposure. If concerns exist about other agents or a mixed release, may recommend PPE to include hooded PAPR and biochem suit, gloves and boots.

Lab Samples Requested for Evaluation:

- Asymptomatic patients should not have samples taken.
- Nasal swabs are NOT to be used as a diagnostic test. They are obtained ONLY if requested by Public Health to be utilized as an epidemiologic investigational tool.

Clinical specimens for culture and/or PCR: Pleural fluid, sputum, fresh tissue, frozen tissue (skin lesions should have biopsies of both the leading edge and eschar center) or transtracheal aspirates. Whole blood (purple top tube) or serum (red/black top tube) may be submitted; a blood culture bottle must be drawn to confirm the PCR result. Cerebrospinal fluid for patients with possible meningitis.

Prophylaxis:

For exposed but asymptomatic:
If available, these patients are candidates for evaluation at a Neighborhood Emergency Help Center (NEHC). A list of opened centers will be provided and transportation from local hospitals to these centers will be arranged. These patients should be provided with Doxycyline 100mg (2.2mg/kg) PO BID x 60 days. Alternate choices include Ciprofloxacin 500mg (10-15mg/kg) PO BID x 60 days.

Treatment:

For those with possible signs of illness:
Inpatient treatment with blood cultures and IV antibiotics until diagnosis can be confirmed. See attached tables.

Reporting:

Report suspect cases immediately to Delaware's Division of Public Health, Epidemiology Branch: 1-888-295-5156 (24/7 coverage).

Contact Information:

Delaware Division of Public Health, Epidemiology Branch: 1-888-295-5156 (24/7). For additional information, view the CDC website: www.bt.cdc.gov.

TABLE 1. Inhalational anthrax treatment protocol*,† for cases associated with this bioterrorism attack

Category	Initial therapy (intravenous)§,¶	Duration
Adults	Ciprofloxacin 400 mg every 12 hrs* **or** Doxycycline 100 mg every 12 hrs†† **and** One or two additional antimicrobials¶	IV treatment initially**. Switch to oral antimicrobial therapy when clinically appropriate: Ciprofloxacin 500 mg po BID **or** Doxycycline 100 mg po BID Continue for 60 days (IV and po combined)§§
Children	Ciprofloxacin 10–15 mg/kg every 12hrs ¶¶,*** **or** Doxycycline:†††,†† >8 yrs and >45 kg: 100 mg every 12 hrs >8 yrs and ≤45 kg: 2.2 mg/kg every 12 hrs ≤8 yrs: 2.2 mg/kg every 12 hrs **and** One or two additional antimicrobials¶	IV treatment initially**. Switch to oral antimicrobial therapy when clinically appropriate: Ciprofloxacin 10–15 mg/kg po every 12 hrs*** **or** Doxycycline:††† >8 yrs and >45 kg: 100 mg po BID >8 yrs and ≤45 kg: 2.2 mg/kg po BID ≤8 yrs: 2.2 mg/kg po BID Continue for 60 days (IV and po combined)§§
Pregnant women§§§	Same for nonpregnant adults (the high death rate from the infection outweighs the risk posed by the antimicrobial agent)	IV treatment initially. Switch to oral antimicrobial therapy when clinically appropriate.† Oral therapy regimens same for nonpregnant adults
Immunocompromised persons	Same for nonimmunocompromised persons and children	Same for nonimmunocompromised persons and children

* For gastrointestinal and oropharyngeal anthrax, use regimens recommended for inhalational anthrax.
† Ciprofloxacin or doxycycline should be considered an essential part of first-line therapy for inhalational anthrax.
§ Steroids may be considered as an adjunct therapy for patients with severe edema and for meningitis based on experience with bacterial meningitis of other etiologies.
¶ Other agents with *in vitro* activity include rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin, and clarithromycin. Because of concerns of constitutive and inducible beta-lactamases in *Bacillus anthracis*, penicillin and ampicillin should not be used alone. Consultation with an infectious disease specialist is advised.
** Initial therapy may be altered based on clinical course of the patient; one or two antimicrobial agents (e.g., ciprofloxacin or doxycycline) may be adequate as the patient improves.
†† If meningitis is suspected, doxycycline may be less optimal because of poor central nervous system penetration.
§§ Because of the potential persistence of spores after an aerosol exposure, antimicrobial therapy should be continued for 60 days.
¶¶ If intravenous ciprofloxacin is not available, oral ciprofloxacin may be acceptable because it is rapidly and well absorbed from the gastrointestinal tract with no substantial loss by first-pass metabolism. Maximum serum concentrations are attained 1–2 hours after oral dosing but may not be achieved if vomiting or ileus are present.
*** In children, ciprofloxacin dosage should not exceed 1 g/day.
††† The American Academy of Pediatrics recommends treatment of young children with tetracyclines for serious infections (e.g., Rocky Mountain spotted fever).
§§§ Although tetracyclines are not recommended during pregnancy, their use may be indicated for life-threatening illness. Adverse effects on developing teeth and bones are dose related; therefore, doxycycline might be used for a short time (7–14 days) before 6 months of gestation.

TABLE 2. Cutaneous anthrax treatment protocol* for cases associated with this bioterrorism attack

Category	Initial therapy (oral)†	Duration
Adults*	Ciprofloxacin 500 mg BID **or** Doxycycline 100 mg BID	60 days§
Children*	Ciprofloxacin 10–15 mg/kg every 12 hrs (not to exceed 1 g/day)† **or** Doxycycline:¶ >8 yrs and >45 kg: 100 mg every 12 hrs >8 yrs and ≤45 kg: 2.2 mg/kg every 12 hrs ≤8 yrs: 2.2 mg/kg every 12 hrs	60 days§
Pregnant women*,**	Ciprofloxacin 500 mg BID **or** Doxycycline 100 mg BID	60 days§
Immunocompromised persons*	Same for nonimmunocompromised persons and children	60 days§

* Cutaneous anthrax with signs of systemic involvement, extensive edema, or lesions on the head or neck require intravenous therapy, and a multidrug approach is recommended. Table 1.
† Ciprofloxacin or doxycycline should be considered first-line therapy. Amoxicillin 500 mg po TID for adults or 80 mg/kg/day divided every 8 hours for children is an option for completion of therapy after clinical improvement. Oral amoxicillin dose is based on the need to achieve appropriate minimum inhibitory concentration levels.
§ Previous guidelines have suggested treating cutaneous anthrax for 7–10 days, but 60 days is recommended in the setting of this attack, given the likelihood of exposure to aerosolized *B. anthracis* (*6*).
¶ The American Academy of Pediatrics recommends treatment of young children with tetracyclines for serious infections (e.g., Rocky Mountain spotted fever).
** Although tetracyclines or ciprofloxacin are not recommended during pregnancy, their use may be indicated for life-threatening illness. Adverse effects on developing teeth and bones are dose related; therefore, doxycycline might be used for a short time (7–14 days) before 6 months of gestation.